

**WHAT IS CLAIMED IS:**

1           1. A system combined with a load sharing structure and a primary/backup structure, the  
2 system having a plurality of sub-systems, the system comprising:

3           a primary unit disposed in each of said plurality of sub-systems to share an event  
4 processing work load according to a load sharing processing order for events;

5           a backup unit disposed in each of said plurality of sub-systems to receive and store only a  
6 minimum amount of data that is necessary for restoration from a primary unit in preparation for  
7 when a primary unit malfunctions;

8           a configuration management unit comprising an index mapping each backup unit with  
9 corresponding primary units, the configuration management unit managing a position of the  
10 primary unit for the backup unit;

11          a distributed algorithm processing unit being programmed and configured to determine  
12 which sub-system processes events when the events are generated;

13          a shared resource unit shared and used in each sub-system and occupied in the primary  
14 units;

15          an event generating unit being programmed and configured to generate events; and

16          a distributed control environment comprised of a middleware platform and being  
17 programmed and configured to distribute processing among the plurality of sub-systems, the  
18 configuration management unit, the distributed algorithm processing unit, and the shared  
19 resource unit.

1           2. The system of claim 1, each backup unit corresponds to a primary unit that is located  
2           in a different sub-system than the backup unit.

1           3. The system of claim 1, the configuration management unit comprising an index for  
2           processing load sharing between the primary units and comprising an index mapping each  
3           backup unit to a corresponding primary unit stored in the configuration management unit.

1           4. The system of claim 1, the distributed algorithm processing unit being programmed  
2           and configured to assign generated events in a round robin fashion to the primary units.

1           5. The system of claim 1, the distributed algorithm processing unit being programmed  
2           and configured to assign generated events to primary units that are the least congested.

1           6. The system of claim 1, the distributed algorithm processing unit being programmed  
2           and configured to calculate load sharing between the primary units and to assign a newly  
3           generated event to a primary unit based on said calculation.

1           7. A distributed control system, comprising:  
2           a plurality of sub-systems, each sub-system comprising a primary unit and a backup unit,  
3           each primary unit being programmed and configured to process generated events;

4 a configuration management unit maintaining an index mapping backup units with  
5 corresponding primary units, each backup unit storing data needed to restore a corresponding  
6 primary unit should the corresponding primary unit fail to process an event;

7 a distributed algorithm processing unit being programmed and configured to assign  
8 generated events to a primary unit within a sub-system for processing; and

9 a logical shared resource unit being accessible by each primary unit from each sub-  
10 system in the processing of said generated events.

1 8. The system of claim 7, each backup unit storing a minimum amount of data needed to  
2 replicate a corresponding primary unit if the corresponding primary unit fails.

1 9. The system of claim 7, the configuration management unit being programmed and  
2 configured process load sharing between the sub-systems.

1 10. The system of claim 7, the distributed algorithm processing unit being programmed  
2 and configured to assign generated events to various ones of said plurality of sub-systems in a  
3 round robin fashion.

1 11. The system of claim 7, the distributed algorithm processing unit being programmed  
2 and configured to assign newly generated events to a least congested sub-system for processing.

1           12. The system of claim 7, the configuration management unit and the distributed  
2 algorithm processing unit being programmed and configured to assign events only to functioning  
3 primary units and not to backup units.

1           13. The system of claim 7, the configuration management unit and the distributed  
2 algorithm processing unit are programmed and configured so that backup units do not participate  
3 in load sharing.

1           14. The system of claim 8, said backup units storing only an index of events, an ongoing  
2 status of the corresponding primary unit and information as to which resources are occupied.

1           15. The system of claim 7, each backup unit serves to duplicate a primary unit located in  
2 a different sub-system than the backup unit.

1           16. The system of claim 7, the component management unit and the distributed  
2 algorithm processing unit are programmed and configured to assign newly generated events to a  
3 primary unit in a sub-system that is least congested.

1           17. The system of claim 7, the configuration management unit being programmed and  
2 configured to generate a new primary unit and a new backup unit when a new sub-system is  
3 added to the system.

1           18. The system of claim 17, the configuration management unit being programmed and  
2           configured to reconfigure which primary units correspond to which backup units when a new  
3           sub-system is added to the system and a new primary unit and a new backup unit are generated.